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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/798,898

03/12/2004

Benjamin B. Houston

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EXAMINER

FREJD, RUSSELL WARREN

ART UNIT

PAPER NUMBER

2128

DATE MAILED: 08/14/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/798,898	Applicant(s) HOUSTON ET AL.	
	Examiner Russell Frejd	Art Unit 2128	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 July 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 2, 4-7 is/are rejected.
- 7) ☒ Claim(s) 3 and 8 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

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Examination of Application #10/798,898

1. Claims 1-8 of application 10/798,898, filed on 12-March-2004, are presented for examination.

Specification Objections

2. The disclosure is objected to because of the following informalities:

Page 10, line 1 The phrase "In Figure 9 is similar" is understood to mean "Figure 9 is similar".

Page 15, line 13 The references cited in the section entitled "REFERENCES", should be included in the specification at the point in which each of the references is first mentioned, and this section should be amended out of the specification.

Objections to the Drawings

3. Drawings 2-5 should be labeled "Prior Art" as they are reproduced from a prior reference [see p. 3, line 4].

Claim Objections under 37 CFR 1.75(d)(1)

4. Claims 1 and 7 are objected to under 37 CFR 1.75(d)(1), wherein:

Claim 1 The phrase on line 1, "where state of a fluid comprising of velocities" needs to be corrected, possibly to "where *the* state of a fluid *comprised* of velocities".

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Claim 7 The phrase on line 1, "where state of a fluid" needs to be corrected, possibly to "where *the* state of a fluid".

Claim Rejections under 35 U.S.C. § 101

5. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter or any new and useful improvement thereof, may obtain a patent therefore, subject to the conditions and requirements of this title.

5.1 Claims 1, 2, and 4-7 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. The invention claims (claim 1 preamble), "*A method of fluid simulation where state of a fluid comprising of velocities is updated in the presence of impermeable objects having surfaces in a given region over discrete time steps by: dividing the region into cells comprising a regular grid and then defining a velocity field which associated a velocity vector with each cell; and recalculating the velocity field at each consecutive time step based on the state of the fluid on the previous time step and the effect of impermeable object surfaces via Navier-Stokes equations comprising calculation of advection and pressure effects.*"

5.2 MPEP Section 2106(IV)(B)(2)(b)(ii) provides that a statutory computer process is determined not by how the computer performs the process, but by what the computer does to achieve a practical application with a useful, concrete and tangible result. For example, a computer process that simply calculates a mathematical algorithm that models noise is nonstatutory, while a claimed process for digitally filtering noise employing the mathematical algorithm is statutory. The long line of cases in this area that are referred to in MPEP Section 2106(IV)(B)(2)(b)(ii) exemplify this requirement, by utilizing in the claim language, terms such as controlling, executing, changing and removing. In view of the aforementioned requirement and

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the interim guidelines for 101 eligibility, the Examiner respectfully contends that the claim language of independent claims 1 and 7, do not claim a practical application with a tangible result, that language claiming: (in claim 1) assigning a value to the velocity vectors, associated with the cells contained within the impermeable objects when the velocity field is used for the calculation of the advection and pressure effects, which is copied from the closest fluid containing cell; and when the value includes a normal component which would cause motion of the fluid into the object, removing the normal component.

5.3 For at least these reasons, the Examiner respectfully posits that the claims of the present invention do not meet the criteria for a statutory process. Accordingly, the claims are determined to be a method of fluid simulation, consisting solely of mathematical operations, converting one set of numbers into another set of numbers, whereby the method does not manipulate appropriate subject matter, and thus cannot constitute a statutory process (MPEP Section 2106(IV)(B)(2)(c)).

5.4 Furthermore, the Examiner respectfully posits that claims 1, 2 and 4-7 of the present invention do not meet the criteria for a statutory process, as these claims are determined to be a program per se, consisting of software modules that implement the method of fluid simulation, whereby the method does not manipulate appropriate subject matter, and thus cannot constitute a statutory process (MPEP Section 2106(IV)(B)(2)(c)).

Claim Rejections under 35 U.S.C. § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

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A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6.1 Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Stam et al., hereinafter Stam, USP 6,266,071.

6.2 Stam discloses in claim 1: a method of fluid simulation [col. 1, ln. 14] where state of a fluid comprising of velocities is updated in the presence of impermeable objects having surfaces in a given region over discrete time steps by: dividing the region into cells [col. 4, ln. 3] comprising a regular grid [ln. 2] and then defining a velocity field which associated a velocity vector with each cell; and recalculating the velocity field [lns. 5-10] at each consecutive time step [lns. 7-10] based on the state of the fluid on the previous time step [lns. 7-11] and the effect of impermeable object surfaces via Navier-Stokes equations [ln. 6] comprising calculation of advection [col. 4, ln. 9] and pressure [col. 11, ln. 30 - col. 12, ln. 3] effects; the improvement comprising: assigning a value to the velocity vectors [lns. 7-11], associated with the cells [ln. 6] contained within the impermeable objects when the velocity field is used for the calculation of the advection and pressure effects, which is copied from the closest fluid containing cell [lns. 10-11]; and when the value includes a normal component which would cause motion of the fluid into the object, removing the normal component [col. 7, lns. 19-21].

Claim Objections

7. Claims 2-6 are objected to as being dependent upon a rejected base claim, but would be

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allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Claim 8 is objected to for being dependent on rejected claim 7 above under 35 U.S.C. 101.

Allowed Claims

8. Claims 7 and 8 are deemed allowable over the prior art of record at this time, pending resolution of any pending rejections noted above. Stam does not disclose defining the impermeable objects as a level set.

Response Guidelines

9. A shortened statutory period for response to this action is set to expire **3 (three) months and 0 (zero) days** from the date of this letter. Failure to respond within the period for response will cause the application to become abandoned (see MPEP 710.02, 710.02(b)).

9.1 Any response to the Examiner in regard to this non-final action should be

directed to: Russell Frejd, telephone number (571) 272-3779, Monday-Friday from 0530 to 1400 ET, or the examiner's supervisor, Kamini Shah, telephone number (571) 272-2279. Inquires of a general nature or relating to the status of this application should be directed to the TC2100 Group Receptionist (571) 272-2100.

mailed to: Commissioner of Patents and Trademarks
P.O. Box 1450, Alexandria, VA 22313-1450

or faxed to: (571) 273-8300

Hand-delivered responses should be brought to the Customer Service Window, Randolph Building, 401 Dulany Street, Alexandria, VA, 22314.

Date: 4-August-2006



**RUSSELL FREJD
PRIMARY EXAMINER**